

PRIORITY

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1. IN ATTEMPT TO PURSUE VALUE FUNCTION ANALYSIS PROCEDURE REFERRED TO IN [REDACTED] 13 OCT 67 LTR TO MESSRS. [REDACTED] INVESTIGATIONS HAVE BEEN UNDERWAY AT [REDACTED] BY TECHNICALLY QUALIFIED TEAM COMPRISED OF [REDACTED] SR-71 SPO [REDACTED] REPS TO DETERMINE APPLICABILITY OF TECHNIQUE TO A-12/SR-71 SENSOR MATERIAL COMPARISON AND AVAILABILITY OF PERTINENT DATA OF SUFFICIENT ACCURACY TO WARRANT FURTHER EFFORT.

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2. FINDINGS OF INVESTIGATIONS, IN VIEW OF CURRENT DEADLINE FOR RESULTS BY 1 DEC, INDICATE THAT AN URGENT REQUIREMENT EXISTS FOR SYSTEM RESOLUTION IN IMAGE SPACE, AS DEGRADED BY TWO SIGMA VALUES OF UNCOMPENSATED IMAGE MOTION, RANDOM AND CYCLIC VEHICLE MOTION, DEFOCUS AND LENS-EMULSION LIMITATIONS. THIS SYSTEM RESOLUTION IS REQUIRED IN TERMS OF POSITION (X, Y) ON THE FORMAT FOR ANY POINTING ANGLE FOR FRAME CAMERAS, AND AT ANY SCAN POSITION FOR PANORAMIC CAMERAS. FOR PURPOSES OF THIS REQUIREMENT, THE OPERATIONAL SYSTEM RESOLUTION AT ANY POINT ON FORMAT WILL BE DEFINED AS K (THE SPATIAL FREQUENCY IN LINES/MM). IMPLICIT IN EACH VALUE OF K MUST BE THE DEGRADATION IN RESOLUTION IN IMAGE SPACE DUE TO:

- A. UNCOMPENSATED IMAGE MOTION (UIM)
- B. RANDOM & CYCLIC VEHICLE MOTION (VM)
- C. DEFOCUS (D)
- D. LENS-EMULSION LIMITATIONS (LE)

THE ABOVE FACTORS YIELD THE SYSTEM RESOLUTION AT A POINT ON THE FORMAT, I.E., THE RESOLUTION RESULTING FROM THE SELECTED FIELD ANGLE OF THE LENS, AS DEGRADED BY OPERATIONAL FACTORS A THROUGH D.

IN TERMS OF MATHEMATICAL NOTATION, K, THE OPERATIONAL SYSTEM RESOLUTION AT ANY IMAGE POINT CAN BE EXPRESSED AS:

1. K EQUALS F (UIM, VM, D, LE)

WHERE

2. K OF UIM EQUALS F (X, Y, P, R)

WHERE X, Y ARE IMAGE POINT COORDINATES

P, R ARE PITCH AND ROLL WHICH INFLUENCE IMAGE SMEAR,

3. K OF VM EQUALS F (X, Y),

4. K OF D EQUALS F (X, Y),

5. AND K OF LE EQUALS F (X, Y).

IF AVAILABLE, PREFER THAT K IN EQUATION 1 BE STATED IN TERMS OF X AND Y COMPONENTS.

IF THE REQUESTED DATA IS AVAILABLE IN MORE THAN ONE FORM, OUR ORDER OF PREFERENCE IS AS FOLLOWS:

- AA. EQUATIONS 1 THROUGH 5

BB. VALUES OF K DEVELOPED VIA THE CASCADED MODULATION TRANSFER FUNCTION (MTF) TECHNIQUE. THIS WOULD REQUIRE AN MTF (PLOT OF SYSTEM MTF VS. K) FOR EVERY IMAGE POINT EVALUATED.

CC. ALL DATA, I.E., GRAPHS, CURVES OR TABULATIONS WHICH REFLECT THE RESOLUTION DEGRADATION, DUE TO A THROUGH D ABOVE, FOR A DISTRIBUTION OF IMAGE POINTS.

DD. ANY COMBINATIONS OF AA THROUGH CC WHICH SATISFIES A THROUGH D.

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END OF MESSAGE

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Declass Review by NGA

GROUP 1
Excluded from automatic
downgrading and
declassification